

ROUTING AND TRANSMITTAL SLIP		Date
		8/4/86
TO: (Name, office symbol, room number, building, Agency/Post)		
1. ADDA	15 AUG 1986	14 AUG 1986
2. DDA		15 AUG 1986
3.		
4.		
5.		
Action	File	Note and Return
Approval	For Clearance	Per Conversation
As Requested	For Correction	Prepare Reply
Circulate	For Your Information	See Me
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Coordination	Justify	

REMARKS

FOR YOUR INFORMATION

*Sounds good*

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
DA/CMS	Phone No.

5041-102

OPTIONAL FORM 41 (Rev. 7-76)  
Prescribed by GSA  
FPMR (41 CFR) 101-11.206

\* U.S.G.P.O.: 1983-421-529/320

DDA 86-1342

4 August 1986

MEMORANDUM FOR: Agency Component Training Officers

FROM: [redacted] Chief  
OTE Training Support Division

SUBJECT: National Technological University,  
Adjunct to the CIA Off-Campus Program

STAT

1. We are pleased to announce that we have implemented the National Technological University (NTU) as an adjunct to the CIA Off-Campus Program. NTU is a consortium of the nation's most outstanding universities in the fields of engineering and computer science. State-of-the-art courses are delivered live, via satellite. Eventually, we will have the capability of providing these courses live, directly at CIA's main facilities in the Washington, D.C. area.

2. In our first semester with NTU this Fall, we will provide four graduate courses after hours (detailed descriptions attached):

AS10-A Intermediate Introduction to Artificial Intelligence  
(University of Massachusetts) (3 Units)  
Tuesdays, 1800 - 2030, 1E74 Hqs.

MA42-J Advanced Engineering Mathematics I  
(Georgia Institute of Technology) (2 Units)  
Tuesdays, 1800 - 2030, 1E78 Hqs.

SS 15-F Software Engineering  
(Northeastern University) (3 Units)  
Wednesdays, 1800 - 2120, 1E74 Hqs.

AS40-A Introduction to Interactive Computer Graphics  
(University of Massachusetts) (3 Units)  
Wednesdays, 1800 - 2030, 1E 78, Hqs.

3. Time to register is short because of NTU requirements. An NTU registration form (copies attached), completely filled out, and CIA's External Training Form 136 must be recieved by TSD/ETB, 826 CofC, no later than 11 August. Cost of the courses, to be paid by the sponsoring component, is \$350 per unit for credit and \$250 to audit. Additional information will be provided after registrations are received. If you have any questions, please call [redacted] secure.

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DDA REGISTRY  
FILE: 18-3

18-3



National Technological University  
P.O. Box 700  
Fort Collins, CO 80522

Please Check One: ☐ CREDIT  
☐ AUDIT

# NTU COURSE REGISTRATION AND ADMISSION FORM

Academic Term 19\_\_\_\_

☐ Fall Qtr/Sem

☐ Winter Qtr/Spr Sem

☐ Spring Qtr

☐ Summer Term

**NOTE:** ONLY COMPLETE APPLICATIONS WILL BE PROCESSED

HAVE YOU INDICATED CREDIT OR AUDIT?

HAVE YOU AND YOUR SITE COORDINATOR (OR SUPERVISOR) SIGNED THE APPLICATION?

**(A) TO BE COMPLETED BY:** 1) ALL COURSE REGISTRANTS (NEW OR CONTINUING STUDENTS)  
2) ALL APPLICANTS FOR ADMISSION

NAME \_\_\_\_\_ SOC. SEC. NO. \_\_\_\_\_  
Last First Middle Suffixes (Jr., Sr., II)

STUDENT CLASSIFICATION - Please check appropriate box.

☐ New NTU student - an individual who has not previously registered for an NTU course.

☐ Continuing NTU student - an individual who has previously registered for an NTU course. (Date of last NTU registration \_\_\_\_\_ mos. year)

PURPOSE FOR WHICH YOU ARE COMPLETING THIS FORM:

☐ Course registration only ☐ Application for admission to an NTU degree program only ☐ Both course registration and admission to an NTU degree program

If you are not applying for admission at this time, do you plan to work toward a degree at NTU? ☐ Yes ☐ No ☐ Uncertain

Proposed or probable NTU graduate major:

☐ Computer Science

☐ Computer Engineering

☐ Electrical Engineering

☐ Engineering Management

☐ Manufacturing Systems Engineering

**(B) TO BE COMPLETED BY:** COURSE REGISTRANTS ONLY (NEW OR CONTINUING STUDENTS)

List course(s) for which you are registering:

NTU COURSE NUMBER	NTU COURSE TITLE	NTU SEMESTER CREDITS	INSTITUTION OFFERING COURSE	COURSE NUMBER	STARTING DATE
EXAMPLE: QS 11W	Engineering Ethics	3	Arizona	ECE 978	9/1/86

SPONSORING EMPLOYER NAME \_\_\_\_\_ YOUR BUSINESS PHONE (\_\_\_\_) \_\_\_\_\_  
AC

DIVISION PLANT FACILITY \_\_\_\_\_

ADDRESS \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Supervisor's or Site Coordinator's approval \_\_\_\_\_ Date \_\_\_\_\_

FOR NTU OFFICE USE ONLY:	
ENTERED SIS _____	SENT TO UNIVERSITY: _____
SITE CODE _____	

**AS 10-A Intermediate Introduction to Artificial Intelligence**

**University of Massachusetts Course Number:** COINS 683

**Academic Contact Person:**

Paul R. Cohen  
COINS Graduate Research Center  
University of Massachusetts  
Amherst, MA 01003  
(413) 545-3638

**NTU Credits:** 3

**Course Level:** Mezzanine

**Number of Lecture Hours:** 28 (75 minute) lectures

**Days Class Meets on Campus:** Tuesday/Thursday

**Term Offered:** Fall

**Instructor:** Paul R. Cohen

**Prerequisites:**

Graduate standing. Introduction to computer science, at least an introductory programming class.

**Textbook:**

*The Handbook of Artificial Intelligence*, Volumes I, II, III, Aaron B. Barr, Paul Cohen and Edward A. Feigenbaum, William Kaufmann, Inc., 1982.

**Course Objectives:**

This course follows Professor Cohen's introductory course in Artificial Intelligence. The course is suitable for newcomers to AI, although the pace will be brisk, especially over the fundamental topics. The ideal student for this course has limited knowledge of AI, and seeks a broad background in all aspects of the field. The course is intended as a substitute for the earlier COINS 583, Introduction to Artificial Intelligence. Both this course (691X) and the earlier 583 are acceptable prerequisites for COINS 691A, (AS 15-A) Advanced Topics in Artificial Intelligence.

**X AS 10-A Intermediate Introduction to Artificial Intelligence**  
(continued)

Heuristic Search. Three Classes of Heuristic Search  
Planning: Planning and the Problem of Backtracking  
Planning: Hierarchical and Non-hierarchical Planners  
Planning: Least-Commitment Planning and Constraints  
Expert Systems: Chemistry.  
Expert Systems: Medicine  
Expert Systems: Education  
Natural Language  
Natural Language Understanding  
Control of Large AI Systems in Noisy Environments: Speech and Vision

**Course Description:**

Fundamentals of AI — search, game-playing, weak methods, planning and problem solving, control structures. Artificial and Human Intelligence — models of human memory, problem-solving, perception, learning, the importance of knowledge. Commonsense Knowledge — reasoning about the physical world, natural language processing, vision. Expert Knowledge — experts and expert systems, architecture and control of expert systems, knowledge acquisition, explanation, validation, reasoning under uncertainty. Acquiring Knowledge — acquisition by being told and by induction, models and examples of learning systems. The lectures will focus on specific AI issues and the programs developed to explore them. Although AI is a young field, the course will stress empirical results and conclusions.

**Course Requirements:**

Homework: Four homework assignments designed to make one think about the reading and lectures. To accomplish the aim of general literacy in AI, the course demands a lot of reading.

Examinations: Two Exams — The exams test one's immediate working knowledge of the field.

Computer Languages: None

Computer Facilities: None

Laboratories: None

Project(s): None

**Course Outline by Topical Areas:**

Introduction to Artificial Intelligence

The Origins and History of AI

Overview of AI. MYCIN and TEIRESIAS.

How MYCIN works

Search and Problem Representation: Search, Spaces, Forward and Backward Reasoning, Exhaustive Search, the Combinatorial Explosion

Search and Problem Representation: Heuristic Search in the Context of Game Trees

X (continued on next page)

Control of Large AI Systems in Noisy Environments: The ARPA Speech Understanding Projects

Control of Large AI Systems in Noisy Environments: Introduction to Vision

Guest Lecture: Professor Allen Hanson, Department of Computer and Information Science, will discuss the UMass VISIONS system

Automatic Deduction: History and Introduction to Theorem Proving. Automatic Deduction

Plausible Inference and Reasoning About Uncertainty Learning

**MA 42-J Advanced Engineering Mathematics I**  
**Georgia Institute of Technology Course Number: MATH 4581**

**Academic Contact Person:**

W. F. Ames  
School of Mathematics  
Georgia Institute of Technology  
Atlanta, GA 30332  
(404) 894-2700

**NTU Credits: 2**

**Course Level: Mezzanine**

**Number of Lecture Hours: 30** (50-minute) lectures

**Days Class Meets on Campus: Monday/Wednesday/Friday**

**Term Offered: Fall**

**Instructor: William R. Smythe**  
School of Mathematics  
Georgia Institute of Technology  
Atlanta, GA 30332  
(404) 894-2716

**Prerequisites:**

Advanced calculus and ordinary differential equations.

**Textbook:**

*Operational Mathematics*, R. V. Churchill, McGraw Hill, ISBN  
07-010870-6.

Student will be able to utilize Laplace and Fourier transforms to solve linear ordinary and partial differential equations.

**Course Description:**

The Laplace transform and its properties, applications to physical systems involving the solution of ordinary and partial differential equations.

**Course Requirements:**

Homework: Yes

Exams: Three

**Course Outline by Topical Areas:**

The Laplace Transform  
Gamma function  
Convolution theorem  
Delta function and Heaviside functions  
Derivatives of transforms  
Partial differential equations  
Applications

**SS 15-F Software Engineering**

**Northeastern University Course Number: ECE 3311**

**Academic Contact Person:**

John G. Proakis  
Graduate School of Engineering  
Northeastern University  
360 Huntington Avenue  
Boston, MA 02115  
(617) 437-4429

**NTU Credits: 3**

**Course Level: Graduate**

**Number of Lecture Hours: 22** (100 minutes)

**Days Class Meets on Campus: Monday/Wednesday**

**Term Offered: Fall**

**Instructor: Ronald Mourant**

330 Snell Building  
360 Huntington Avenue  
Northeastern University  
Boston, MA 02115  
(617) 437-3931

**Prerequisites:**

Experience in higher level and/or assembly language programming.

**Textbook:**

*Software Tools in Pascal*, V. W. Kernighan, P. J. Plauger, Addison-Wesley, 1981.

**Course Objectives:**

To describe basic concepts in software engineering.

**Course Description:**

An introduction to basic problems, methods and ideas in software engineering, including structural design, complexity, testing and debugging.

**Course Requirements:**

Homework: 8-10 weekly assignments

Examinations: Midterm and final project

Computer Languages: Pascal

Computer Facilities: None

Laboratories: None

Project(s): Final Project

**Course Outline by Topical Areas:**

Basic concepts/problems in software engineering  
Structured software design and testing techniques  
Maintenance and management techniques  
Case studies of software design problems

**AS 40-A Introduction to Interactive Computer Graphics**

**University of Massachusetts Course Number:** ECE 660

**Academic Contact Person:**

Francis S. Hill, Jr.  
Marston 139, College of Engineering  
University of Massachusetts  
Amherst, MA 01003  
(413) 545-0767

**NTU Credits:** 3

**Course Level:** Graduate

**Number of Lecture Hours:** 42 (50 minute) lectures

**Days Class Meets on Campus:** Monday/Wednesday/Friday

**Term Offered:** Fall

**Instructor:** Francis S. Hill, Jr.

**Prerequisites:**

The ability to write programs in a high-level language such as Fortran or Pascal; familiarity with matrix algebra, trigonometry, elementary calculus.

**Course Requirements:**

**Homework:** Four sets of homework exercises

**Computer Facilities:** The course focuses on line-drawing graphics, so most vector or raster devices will suffice as long as they can produce hard copy of graphics. A graphics terminal connected to a host computer, or a stand-alone computer (IBM PC, Amiga, etc.) will meet the needs of the programming projects. The computer must support a high-level language such as Pascal, C or Fortran. Basic can be used, but is not recommended.

**Project(s):** Three programming projects

**Course Outline by Topical Areas:**

Overview of computer graphics — Its capabilities and limitations.

Simple plotting versus interactive graphic. Basic types of graphics devices. Graphics versus digital image processing.

**Textbook:**

*Fundamentals of Interactive Computer Graphics*, Foley and Van Dam, Addison-Wesley, 1982.

**Course Objectives:**

Display devices — CRT displays, plotters and film recorders, vector and raster displays, clipping and windowing, transformations. Curve design — B-splines, Bezier curves, etc. Interactive Graphics — Input devices, meaning and interaction. Three-dimensional graphics — perspective and parallel projections, three-dimensional transformations, hidden surface elimination.

**Course Description:**

This course explores the lore and techniques of modern interactive computer graphics. The course includes: Programming projects to design and implement programs which use computer graphics in engineering applications; discussions of what interactive computer graphics entails and how a graphics program must be structured in order to be most effective; an overview of currently available graphics equipment.

Mathematical elements of computer graphics — Transformations, rotations, scaling, translations, projections and perspective. Clipping and windowing.

Graphics Packages — Survey of underlying pictures, display files, and picture structure. Overview of management of segmented display files. Introduction geometric modeling.

Interactive computer graphics — Input devices and techniques: pointing, picking, and positioning. Event handling, interrupts and polling. Dragging, drawing, and fixing.

Special advantages and problems — The frame buffer and scan conversion. Use of color. Displaying characters. Solid areas and their representation. Interactive raster graphics.

Three-Dimensional graphics — Curves and surfaces: Splines, Bezier methods and revisited. Transformation and perspective. Hidden line and surface removal algorithms. Shading.